CLAIMS

What is claimed is:

1. A method for distributed medium access that schedules transmission of frames on a channel in a wireless access network comprising an access point and a plurality of stations

5 illuminated by multiple beams of an antenna system emanating from said access point, which antenna system does not enable simultaneous communication on the same channel in opposite directions between said access point and any two stations covered by different beams, in a way that reduces channel capture, comprising the steps of:

Said stations transmit according to a medium access protocol that allows the initiation of

10 transmission only when the channel is idle; and

requiring all stations engaged in uplink transmission to release the channel at the same time, causing the channel to become idle at that time and thus preventing capture of the channel by uplink transmissions.

2. The method for distributed medium access of claim 1, which further comprises:

15 Requiring the access point to terminate downlink transmission on all beams simultaneously, causing the channel to become idle at that time and thus preventing uplink transmissions that will not be received successfully at the access point.

3. The method for distributed medium access of claim 1 or claim 2, which further comprises:

Determining whether the channel is idle through carrier sensing.

20 4. The method for distributed medium access of claim 1 or claim 2, which further comprises:

Determining whether the channel is idle through timers maintained at the non-transmitting stations and set to the duration value indicated upon reservation of the channel.

5. The method for distributed medium access of claim 1, which further comprises:

Synchronizing the clocks of the stations; and

25 requiring the times at which stations engaged in uplink transmissions to release the channel to conform to a previously-designated schedule.

6. The method for distributed medium access of claim 3, which further comprises:

The access point transmitting dummy frames on certain beams so as to cause transmission

30 on all beams to terminate simultaneously.

7. The method for distributed medium access of claim 4, which further comprises:

The access point setting the duration of channel reservations on different beams so as to cause channel reservations on all beams to terminate simultaneously.

8. The method for distributed access of claim 5, which further comprises:

Having several release schedules specified and distributed previously, and one chosen based on time of day.

9. The method for distributed access of claim 5, which further comprises:

Having several release schedules specified and distributed previously, and one chosen based on network conditions.

10. The method for distributed medium access of claim 5, which further comprises:

Achieving synchronization of the clocks of all nodes within the same cell by the AP transmitting over the air a frame containing a timestamp to which all associated nodes set their clocks.

11. The method for distributed medium access of claim 5, which further comprises:

Achieving synchronization of the clocks of all stations within the same cell by requiring some or all stations to extract time information from signals generally available outside the network

12. The method for distributed medium access of claim 11, which further comprises:

Achieving synchronization of the clocks of all stations within the same cell by extracting time readings from radio signals intended for navigation and positioning

13. The method for distributed medium access of claim 11, which further comprises:

Achieving synchronization of the clocks of all stations within the same cell by extracting time readings from radio signals intended for national time synchronization

14. The method for distributed medium access of claim 5, which further comprises:

Achieving synchronization of the clocks of all stations within the same cell by the use of a network time reference, such as an NTP server.

15. The method for distributed medium access of claim 1, which further comprises:

Timing acknowledgement of successful receipt by the access point of frames transmitted uplink to occur before the access point relinquishes the channel for uplink transmission, thus

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enabling a station whose transmission remains unacknowledged by the time the station may access the channel again to retransmit said frame at that time.

16. The method for distributed medium access of claim 2, which further comprises:

Timing acknowledgement of successful receipt by a station of frames transmitted by the access point to occur, before the station relinquishes control of the channel thus enabling the access point to retransmit any frames that remain unacknowledged by the time the AP regains control of the channel.

17. The method for distributed medium access of claim 2, which further comprises:

Limiting transmissions that occur while the access point has control of the channel to frames that do not require acknowledgement and to frames directed to a single station per beam, thus permitting acknowledgement by such station to be sent without contention.

18. The method for distributed medium access of claim 15, which further comprises:

Using a compound acknowledgement for all frames transmitted uplink by a single station and during the time interval between two consecutive designated channel release times, thus reducing the channel time used for acknowledgements.

19. The method for distributed medium access of claim 16, which further comprises:

Using a compound acknowledgement for all frames transmitted by the access point to the same station and during the time interval between two consecutive designated channel release times, thus reducing the channel time used for acknowledgements.

20. The method for distributed medium access of claim 15, which further comprises:

Using a compound acknowledgement for all frames transmitted uplink by stations covered by the same beam and during the time interval between two consecutive designated channel release times, thus reducing the channel time used for acknowledgements.